

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of)
:
Ikuo Shimizu, et al.)
:
Group Art Unit: 1626
Serial No. 10/579,820)
:
Examiner: Robert H. Havlin
Filed: MAY 17, 2006)
:
For: FILTERS FOR ELECTRONIC DISPLAY DEVICES)

Commissioner for Patents
P.O.Box 1450
Alexandria, VA 22313-1450

DECLARATION

Sir:

I, Motoharu Kinugasa of 2-4-41-3B, Yasujima, Yokkaichi-shi, Mie, Japan, do declare as follows: I finished my bachelor course at Department of Chemistry, Faculty of Science and Technology, Kyoto Institute of Technology in March, 1991, and I was given the degree of BSc. I finished my master course at Division of Chemistry and Materials Technology, Graduate School of Science and Technology, Kyoto Institute of Technology in March, 1993, and I was given the degree of MSc. I finished my doctor course at Division of Materials and Life Science, Graduate School of Science and Technology, Kyoto Institute of Technology in March, 1997, and I was given the degree of Ph.D.

From April, 1993 to March, 1994, I was employed by Nippon Paint Co., Ltd.

From January, 1997 to March, 1998, I was employed by Kyoto Institute of Technology.

From July, 1998 to March, 2004, I was employed by Kyowa Yuka CO., LTD.

Since April, 2004, I have been employed by Kyowa Hakko Chemical CO., LTD., the assignee of the above-identified application.

From April, 1993 to March, 1994, I was engaged in

the research on development of new paints at Research Center of Nippon Paint CO., Ltd.

From January, 1997 to March, 1998, I was engaged in the research on application of asymmetric synthesis at Graduate School in Kyoto Institute of Technology.

From July, 1998 to March, 2004, I was engaged in the research on synthesis and application of dyes (especially for optical recording media and for optical filters) at Yokkaichi Research Laboratories of Kyowa Yuka CO., LTD.

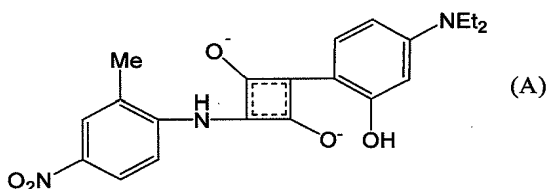
Since April, 2004, I have been engaged in the research on synthesis and application of dyes (especially for optical recording media and for optical filters) at Yokkaichi Research Laboratories of Kyowa Hakko Chemical CO., LTD., the assignee of the above-identified application.

The following experiment was conducted under my direction.

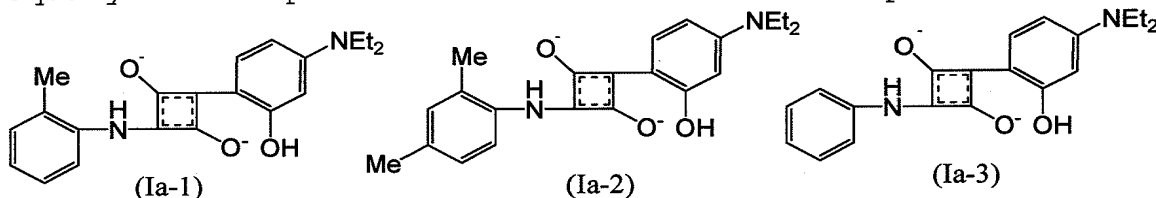
EXPERIMENT

(1) Compounds

The squarylium compound represented by Formula (A), compound 1 in the table 1 of Shimizu et al. (US 6,599,605), was prepared according to the method described in US 6,599,605. Hereinafter, the squarylium compound represented by Formula (A) is referred to as compound (A). This is also applicable to compounds represented by Formula (Ia-1), (Ia-2) and (Ia-3).



Compounds (Ia-1), (Ia-2) and (Ia-3) are the squarylium compounds which are used for the present filter.



Compound (Ia-1) was prepared in a similar manner to that of Reference Example 6 of the present application except that 2-methylaniline was used instead of N-methylaniline.

Compound (Ia-2) was prepared in a similar manner to that of Reference Example 6 of the present application except that 2,4-dimethylaniline was used instead of N-methylaniline.

Compound (Ia-3) was prepared in a similar manner to that of Reference Example 6 of the present application except that aniline was used instead of N-methylaniline.

(2) Method

1,2-Dimethoxyethane(DME), methyl ethyl ketone(MEK) or toluene(TL) was used as an organic solvent.

To 5 mL of the organic solvent, a squarylium compound was added to an extent that some of the squarylium compound remained insoluble. The mixture was irradiated with ultrasonic waves for 10 minutes and stirred for 20 hours at 25 °C. After the squarylium compound crystals were removed by filtration and the filtrate was diluted y-folds with chloroform, the absorbance at the maximum absorption wavelength present in 400 to 600 nm was measured with a spectrometer. The solubility of the squarylium compound was calculated according to the following equation:

$$\text{Solubility (percent by weight)} = y \cdot A \cdot M_w / (\epsilon \cdot d \cdot 10)$$

y; Degree of dilution

A; Absorbance at maximum absorption wavelength (1/cm)

M_w; Molecular weight of squarylium compound (g/mol)

ε; Molar extinction coefficient at maximum absorption wavelength (L/mol·cm)

d; density of an organic solvent (g/mL)

(3) Results

The results of the solubility in organic solvents are shown in Table-1.

Table-1

compound	Solubility(percent by weight)		
	DME	MEK	TL
(Ia-1)	0.24	0.21	0.02
(Ia-2)	0.12	0.11	0.02
(Ia-3)	0.03	0.02	0.001
(A)	0.01	0.01	0.001

(4) Conclusion

It was confirmed from Table-1 that compounds (Ia-1), (Ia-2) and (Ia-3), the compounds which are used for the present filter, are superior to compound (A) taught by Shimizu et al.(US 6,599,605) in terms of a solubility in an organic solvent.

The undersigned declarant declares further that all statements made herein of his knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Executed this 18th day of JUNE, 2009.

Motoharu Kinugasa
Motoharu Kinugasa